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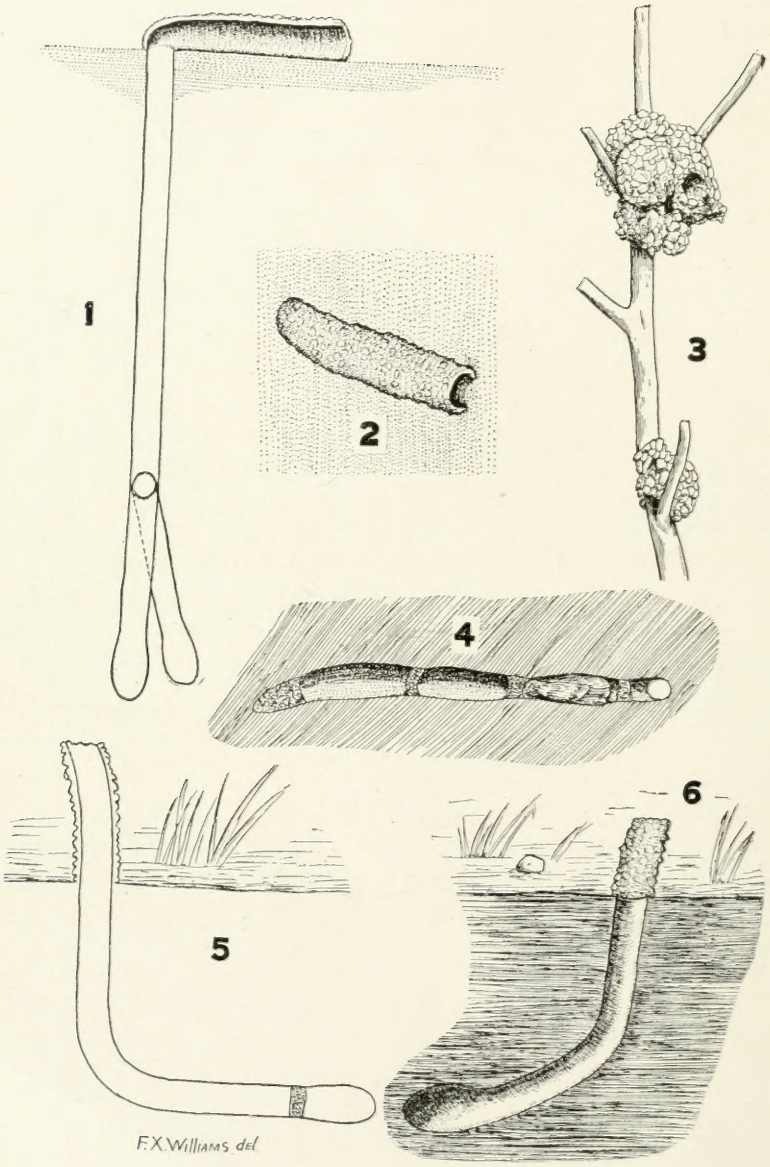

BIOLOGY OF HYMENOPTERA—HUNGERFORD & WILLIAMS.

ENTOMOLOGICAL NEWS

AND

PROCEEDINGS OF THE ENTOMOLOGICAL SECTION

ACADEMY OF NATURAL SCIENCES, PHILADELPHIA.

VOL. XXIII. JUNE, 1912. NO. 6.

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Biological Notes on some Kansas Hymenoptera.

By H. B. HUNGERFORD and FRANCIS X. WILLIAMS, University of Kansas.

(Plates XIV, XV, XVI)

This paper is based on the collection and field observations made by the authors on the Kansas University Biological Survey to Northwestern Kansas during the summer of 1910.

During the time that we were in the field (June 16 to September 3) a large number of Hymenoptera and other insects were collected, and some interesting notes made on the biology of a few species, particularly on the Fossores (Digger wasps), and the Diplopteryga in the Solitary wasps.

Some of the observations are very fragmentary, and have been noted heretofore and published; others we believe are additions to science. We hope that the results of our observations will encourage students to pay more attention to this fascinating branch of entomology.

The Great Plains as represented in Northwestern Kansas, though meager in some groups of insects, have a good repre-

sentation of Hymenoptera and offer excellent facilities for the study of their habits. As the region in question is practically devoid of trees, excepting in some of the richer bottom lands, ground-dwelling bees, wasps and ants are abundant, while wood-borers in this order of insects are rather sparingly represented, and necessarily largely restricted to the margins of streams.

We have derived much information from Peckhams' "Wasps, Solitary and Social" (1905), and "The Instincts and Habits of Solitary Wasps" (Madison, Wis., 1898), and Cambridge Natural History Vol. VI, Insects, as well as from other publications.

Most of the species collected were readily identified by means of the Snow Entomological Collections; doubtful cases of identification and those which could not be determined by us were submitted to specialists.

The photographs were taken by Professor P. A. Glenn, of the Department of Entomology here, and the drawings, made by the joint authors.

Series HETEROGYNA

Family MYRMICIDAE

Pogonomyrmex occidentalis Cress. (*Myrmica*), Proc. Ent. Soc., Phil. IV, 426, 1865.

The "Mound-Building Prairie Ant." The hills of this species are familiar objects in Central and Western Kansas and elsewhere on the "Great Plains;" the larger cleared areas in which they are located make such settlements very conspicuous to the traveler.

The covering of the mound depends largely upon the surrounding material, for although they are usually covered with small pebbles or gravel, in the vicinity of railroads cinders are largely employed, giving the nest a black appearance.

Mr. George A. Dean, of the Kansas Agricultural College, at Manhattan, has published his interesting observations in Kansas on this species of ant.*

*Trans. Kansas Acad. Science XIX, pp. 164-170, 1903-04.

He found that the average height of the cones in the grass on the prairies was about nine inches, those in an alfalfa field in Ellis County being about four inches high. The size of the clearings varies also. "The clearings surrounding the nests located in the buffalo grass averaged nine feet; those in the Russian thistles, eleven feet; those in an alfalfa field, thirteen to fourteen feet." From these data it would seem that the extent of the clearings was greatest where the material to be eradicated could be handled with the greatest facility, and of smaller diameter in those localities where the clearings could be effected with difficulty.

The openings to the cones may be single, or rarely several. Although Mr. Dean states: "There is no uniformity in regard to the direction of the gates. However, the tendency seems to be to the East, Southeast and South," we have found that in the many nests examined, by far the larger per cent. have their openings well down on the southeast side, or more toward the east. It might, therefore, be possible that the ants are affected here by some heliotropic influence, which would induce them to construct the openings to their nests in a position where the sunlight would fall.

Several nuptial flights of *Pogonomyrmex occidentalis* were observed in Wallace and Wichita Counties in August during the afternoon when the warm damp weather brought them out by the hundreds. It was very disagreeable to encounter a swarm of these insects which alighted on us by the dozens and crawled about our heads in the most aggravating manner. The queens appeared to be in the minority and one was frequently the center of a ball made up of frantic males, while the workers ran about, tugging and biting in their excitement. Several queens were observed each attempting to found a new colony. Each excavated a hole and piled the soil some little distance away from the burrow.

A few nests of this species were treated with carbon bisulphide to the extent of from one to two and a half tablespoonfuls to each nest. The liquid was either poured down the highest aperture, or the top of the hill was scooped off until a

suitable gallery was found and then all was covered and allowed to remain thus for at least half an hour. The results were not very satisfactory; the poison had the effect of killing some and driving others farther down, and as Mr. Dean has found "these galleries and chambers penetrating the earth to the distance of nine feet," it is probable that a much larger dose and more thorough application of it would be required to make the treatment effectual.

When aroused the ants are quite warlike and fearless but seem to have some special disgust for certain Scarabaeid beetles (*Onthophagus* probably *hecate*) which were placed on their mound at the gallery entrance. The beetles at first resisted when attacked and as many as ten ants took part in the expulsion of each beetle; but when the beetle gave up, only two or three ants were left to the task of removing the obnoxious visitors, and finally but one ant, the original ejector, was left on the job. The several beetles were removed some ten or twelve feet from the cone.

No insect enemies of this ant were observed. Moreover, on a number of occasions the common tiger beetle of the region (*C. punctulata*) was observed to approach one of these ants, but, having ascertained what it was, did not molest it. No nests were inspected for inquilines; however, in Gove and Greely Counties these ants were seen carrying the myrmecophilous beetle (*Cremastocheilus saucius* Lec.).

Series FOSSORES

Family SPHECIDAE

Ammophila sp.

Much has been written concerning these remarkable wasps, which have attracted the attention not only of naturalists but also of the casual observer.

Frequently, if not as a rule, Ammophilas live in colonies, though one may sometimes come across one of these wasps with her burrow at quite a distance from any colony. Flat, sun-baked areas with little or no vegetation are favorable nesting places for these slender wasps.

Kellogg in his "American Insects" gives a good illustrated account of the habits of *Ammophila sp?* which excavates burrows on the saline flats along San Francisco Bay, in California. That species closes its burrow with the disk of salt-incrusted sand which it cut out in the first place to commence the excavation.

The Peckhams in their "Instincts and Habits of Solitary Wasps" have made extended observations on the habits of *Ammophila urnaria*. These close the entrance of their burrows with lumps of earth or small stones and pack down the superimposed dirt with a pebble making all smooth like the surrounding well packed soil.

The genus *Ammophila* stores its burrows with lepidopterous larvae of several species. That described by Kellogg, uses a Geometrid, and *urnaria* a Noctuid. A rather small species observed in Cheyenne County, Kansas, in July, selected a green Noctuid larva. We observed her on the tent roof struggling with a green cutworm she was trying to carry away. It appeared that the larva stuck to the cloth and would neither raise itself nor roll off. The wasp grasping the back of the larva near the head with her mandibles, reached up and inserted her sting in the ventral part of the thorax. This made the larva let loose and after some tumbling the two rolled off the tent to the ground, and *Ammophila* straddling its prey carried it about three feet, then dropping it went off about three inches, scratched away some dirt, removed a lump of baked earth, and went down the hole thereby opened. Emerging she returned to the larva, pulled it to the hole, and descending into the latter backwards, dragged the larva after her. She soon came out, replaced the lid (the lump of baked earth) and carefully scratched dirt upon it, using her head to tamp it down upon the lid. Then picking up a small stick she packed the earth down a little, after which she scratched more dirt over the place. Three times she returned to make the deception more complete. So carefully did she do her work that the onlookers could not positively locate her nest.

A larger species was observed in Rawlins County in the act

of closing its burrow, which was vertical with an enlarged cup-shaped mouth. The hole, about six inches deep, was partly filled with sand-clay, and *Ammophila* was seen pressing the dirt down in the cup, using as a tool the tibia and tarsus of a small Acridiid (*Melanoplus?*). After this tamping work was over, she placed a lump of dry earth and a small piece of lizard excrement in the depression. We dug out the burrow and at the bottom of it found a Notodontid larva with an oblong egg on its side.

Chlorion caeruleum Drury.

This large and handsome steel-blue wasp was not uncommon in Northwestern Kansas, though little was ascertained concerning its habits.

In Cheyenne County they were seen congregated in some numbers on the branches of an old willow tree. Their attraction to the latter lay in the exudation from some of its limbs, which was evidently caused by borers. A lepidopteron (*Satyrus*), a fly (*Tabanus atratus*), some *Polistes*, and the large cicada-killer (*Stizus speciosus*) were likewise attracted to the exudation, and it was amusing to watch the quarrelsome Chlorions annoy their larger neighbor (*Stizus*). Frequently the latter, desirous of alighting on a choice spot, would be prevented from doing so by a *Chlorion* running up to the place. The Chlorions likewise quarreled among themselves to a considerable extent, and in the ensuing struggle would often fall nearly to the ground. A *Stizus* engaged in lapping up the exudation would be nipped at from behind by the active Sphecid, and in one instance the latter was seen to seize the Cicada-killer in its mandibles and lift it into the air; both then fell to the ground, but the short struggle did not appear harmful to either combatant. An annoyed *Stizus speciosus* would to some extent keep its tormentor at a distance by the threatening motion of its abdomen and sting.

In another portion of the valley, this species was plentiful about slender willows, feeding at the sap exuding from the thickened stems, the flow of sap being produced by a beetle

larva. *Polistes* and Diptera were chased from the coveted spot, the *Chlorion* making short threatening rushes at what it considered intruders. Ants were not in favor either, but were driven away with a show of unwillingness on the part of the wasp, which made gingerly digs at them with its mandibles until the desired object was obtained.

The Peckhams* have observed *Chlorion caeruleum* storing its nest with the cricket *Gryllus abbreviatus*. At Tribune, Greeley County, Kansas, August 17, 1910, we observed a female of this species running up a clay bank, carrying a mature female *Ceutophilus* near *bruneri* (Locustidae). The wasp was evidently striving to reach a sufficient altitude to fly to its nest with its somewhat heavy burden.

The habits, therefore, of *Chlorion* seem to vary somewhat as regards the provisions used, and though the latter with this species are probably always an Orthopterous insect, the species must to some extent be determined by the abundance or scarcity of certain Orthoptera.

No tunnels of *Chlorion* were dug out; the Peckhams, however, figure one in their book on Solitary Wasps; it is large, trending obliquely and terminates in a pocket.

Family Bembecidae

Bembex sayi Cress.

Atwood, Rawlins County, Kansas, July 19, 1910.

A burrow of this species which was dug out of a sandy slope was about eighteen inches in length, sloped slightly downward and terminated in a chamber, which contained a quarter grown *Bembex* larva abundantly supplied with dead flies, among which were three Tachinids (*Archytas analis* Fabr.), a Stratiomyid allied to *appiculata* and *mcigenii;* a Tabanid of the genus *Chrysops,* one *Musca domestica,* two flesh flies and the remains of several other flies.

A species of *Bembex* found in Wichita County was taken from a burrow at the depth of two and a half feet.

*Wis. Geol. and Nat. Hist. Surv. Bull. No. 2, Scientific Series No. 1, —pl. 73-4, 1898.

Family Crabronidae

Trypoxylon texense Sauss. (Pl. XVI; fig. 5).

This was found to be a rather common insect in Cheyenne County, frequenting the clayey banks where they made use of deserted bee tunnels for their nidi. Some of these holes were probably those made by the bee *Melitoma grisella,* which occurred in this locality. One burrow dug out was about five inches long, nearly horizontal and terminating in a smooth somewhat inclined cell packed with nine little spiders.

In Greeley County we found this wasp using tunnels made by the large bee, *Anthophila occidentalis.* From one burrow containing three cells we took fifty-one small spiders. *Texense* sometimes makes use of the cell of *Anthophora* and again they will stop up the tunnel a little and enlarge it locally to suit their own fancies.

The nine spiders taken from our cell of a *Trypoxylon* burrow, Cheyenne County, were as follows: *Rucinia aleatorea, Argiope trifasciata, Xysticus cunctator.** The fifty-one spiders taken from three cells of a *Trypoxylon* burrow, Greeley County, were: *Philodromoides pratariae, Argiope trifasciata, Metepeira labyrinthea, Misumena americana, Dendryphantes octavus, Phidippus texanus,* thus representing eight genera and eight species.

Crabro interruptus St. Farg.

We shall soon see how the Pyralid, *Loxostege sticticalis* Linn., is destroyed in its larval stage by *Odynerus annulatus.* Observations along the Sappa Creek, near the town of Oberlin, Decatur County, have shown that the adult moth also falls a prey to a species of wasp (*Crabro interruptus*), which stores its nest with them.

On July 19th, 1910, a box-elder stump (*Acer negundo*) showing the work of some sort of borers was sliced off until a number of more or less vertical tunnels was revealed in the decaying wood. Some of these at least seemed to be the work of one of the Uroceridae, a larva of which was dug out. Other

*Determined by Nathan Banks, of the U. S. National Museum.

holes were evidently the work of Coleopterous larvae, a species of which was taken.

A number of these holes were occupied by the *Crabro,* several adults of which were dug out. The stump was quite soft and it is possible that *Crabro* utilized the galleries of other insects, modifying them according to its needs.

The nests (Pl. XIV, fig. 4) had their several cells separated from one another by partitions of wood dust. Each of the occupied cells had been provided with moths, almost all of the species *L. sticticalis* (for moth see Pl. XVI, fig. 7), perhaps also with *L. commixtalis* Walker, which were not as abundant as the former, and one or two other small species of moths.

No larvae of *Crabro* were found, but several unopened cocoons examined later contained dead adult wasps. The brown, paper-like cocoon itself was enveloped and hidden by the moth wings arranged in a more or less shingled manner and other portions of the consumed moths. The base of the wings of the moth always faced the distal end of the cell, showing that *Crabro* always brought its prey in head first.

Early in 1911, several of the *Crabro* cocoons were opened and two revealed a Hymenopterous larva, evidently one of the Parasitica.

It may be of interest to know that *Loxostege sticticalis* and *commixtalis,* occur in Europe as well as in America, and may be therefore an importation from the Old World. These two moths, particularly the first mentioned, are abundant in Northwestern Kansas and undoubtedly have a wide range in the United States. The larva is considered an alfalfa pest by the farmers, and was found to be very abundant on the obnoxious Russian thistle (*Salsoka kali*), and in Wichita County were observed moving in armies of considerable magnitude.

The Peckhams in their book "Wasps, Solitary and Social," report a *Crabro* sp? as provisioning its nest with white moths which it packs lengthwise of the cell. They found four species of moths in the nests opened.

Series DIPLOPTERYGA

Family EUMENIDAE

Odynerus annulatus Say.

Leoti, Wichita County, Kansas, August 21st, 1910.

We were fortunate in finding two females of this species in the act of searching for a suitable nesting place. This was shortly before 9 A. M. The ground the wasps were surveying was quite clear of vegetation in areas of several square inches. Russian thistle was abundant everywhere, and at a distance of about 100 yards north and east were small shallow lakes or lagoons. At about 9.05 A. M., the first wasp having chosen its building site, commenced excavating, and at 9.40 the second did likewise. The locations chosen were about six feet apart, and for convenient reference the first *Odynerus* (9.05 A. M.) shall be designated E (East) and the second W (West) in accordance with the positions of their excavations. They went to work as follows:

The spot chosen was moistened, the earth thus softened was removed and arranged around the slight excavation in the form of a circular wall or tube. *Odynerus* worked but for a minute or so when she flew away in the direction of one of the lagoons, to return in an equally short time with her mouth parts glistening with water. More moistened earth was taken out and applied to the wall. In making the latter which is rough exteriorly and smooth inside, *Odynerus* employs her forelegs and mouth parts for the interior work and clings over the side of the tube with her two other pairs of legs. The abdomen is apparently applied to hold back the oncoming wall.

After twenty minutes both wasps had excavated holes as deep as, or deeper than, themselves and constructed a short almost vertical tube over them.* As the work advances only a part of the pellets of earth extracted from the gallery are used for tube construction, the rest are carried off and dropped several feet away. It is noteworthy that *Odynerus* in disposing of the pellets of earth (which she does when on the wing),

*Later investigations show that the tube is often considerably bent.

does not cast them about indiscriminately for it was observed that W dropped them at a distance of from four to six feet east of its nest, while E disposed of hers to a distance of about three feet in a direction W. N. W. from its burrow.

A note made at 10.30 A. M. reads: "W took out three pellets of moist earth in succession, dropped them and then flew away east for water. The tube she was building was over one-half an inch high and taller than that of E, notwithstanding the fact that E had commenced building about half an hour earlier than W." The pellets which are used for tube building are moistened yet more when brought up to the surface.

As the tunnels neared completion the wasps appeared to work less systematically and regularly and stayed away longer. At 10.52 A. M., W seemed to have finished its tube.

On August 22 and 23 the wasps were occasionally watched. At that date, however, their tubes were finished and aside from noting that they took occasional trips (we saw one of the two make seven trips in thirty minutes, and bask in the sun), nothing of interest was observed. However, some of the actions of *Odynerus* must have escaped our notice, for at 8.35 A. M. of the following day (August 24), each wasp was seen to bring in a larva of the Pyralid *Loxostege sticticalis,* which must have been nearly mature, but nevertheless was easily carried in air by the hymenopteron. These larvae were exceedingly common on Russian thistle. A few hundred yards away from our camp we noted an army of these worms composed of thousands of individuals, marching in a northerly direction.

At 9.30 A. M. of the same day (August 24) we caught and killed E and dug out her nest. The tube over the hole was 9-16 inch high, nearly ¼ inch diameter inside measurement, and had an uneven rim (see Pl. XIV, fig. 6). The tunnel was vertical for 1¼ inches and from that depth curved in a westernly direction for 1¾ inches. The terminal cell, which was slightly greater in diameter than the gallery and horizontal, was not yet closed, but contained two *sticticalis* larvae, paralyzed so as to be almost incapable of motion. Evidently *Odynerus* had but begun provisioning its nest. It did not, however, delay laying

its elongate egg so that its progeny would have every advantage of developing successfully in being supplied with the freshest food. The following quotation from the Cambridge Natural History, VI, Insects, pt. 2, p. 75, relates to Fabre's observations on *Odynerus reniformis* and shows the remarkable instinct of the insect in safeguarding its egg: "This insect provisions its cells with small caterpillars to the number of twenty or upwards. The egg is deposited before the nest is stocked with food; it is suspended in such a manner that the suspensory thread allows the egg to reach well down towards the bottom of the cell." By this arrangement there is no danger of the egg being crushed in the mass of caterpillars which may not be completely deprived of motion, which Fabre states is the case in a related genus (*Eumenes*).

At 10 A. M. we dug out the burrow made by W. This wasp was much the faster worker. Fig. 5, Pl. XIV, shows its tube which was 1 1-30 inch tall. We had already filled the cell with nine larvae and had oviposited some time previously, as shown by the small wasp grub within. Some of the imprisoned larvae were capable of considerable activity. The cell was closed with a wad of packed soil 1-5 inch thick.

It is possible that these two *O. annulatus* would have added other cells to their burrows, inasmuch as one such branched hole was located in Scott County. It stands to reason, however, that *Odynerus annulatus* must store several cells, and lay more than one egg to be able to propagate its species.

A closely related species, *O. geminus* Cress, to which we shall now refer, makes a several-celled tunnel but does not construct a tube to the aperture. Sharp, in the Cambridge Natural History VI, Insects, p. 74, in speaking of *Odynerus* mentions the fact that several species of the sub-genus *Hoplopus* "have the remarkable habit of constructing burrows in sandy ground and forming at their entry a curvate, freely projecting tube, placed at right angles to the main burrow, and formed of the grains of sand brought out by the insect during excavation and cemented together." In several localities we noticed on rare occasions much narrower clay tubes than those of *Odynerus an-*

nulatus, and very long in proportion. One noted projected freely from the face of a cliff, curved downward and was about two inches long. The architect was not captured.

O. annulatus is common in Kansas.

Odynerus geminus Cress.

Scott County, August 24, 1910.

This wasp was quite common in a bare strip along a roadside near Scott City. A large number of males but no females were seen here.

As heretofore stated, the tunnels of *geminus* (Pl. XV, fig. 7 and Pl. XVI, figs. 1-4) had no mud tubes over them, and a part at least, if not all, of the pellets of earth are deposited within two or three inches from, or even closer to, the entrance of the hole, and this makes their nests more easily discerned than those of *annulatus. O. geminus* was not seen making its burrows in Scott County, though in Wichita County an *Odynerus* was seen starting a hole and depositing the pellets extracted therefrom about 1½ inches away from the excavation.

The tunnels of *geminus,* which were often rather closely associated, were in barren hard soil or more or less sandy loam, with plenty of lagoons and ponds in the vicinity. Several were dug out, one of which is illustrated in Plate XV, figs. 6 and 7 in vertical and in horizontal section. The holes are shallow as in *annulatus* and vertical for some distance. It would appear that *geminus* utilizes its holes for a second brood, possibly enlarging or adding chambers to the old nest, for none of those examined would indicate that they were newly made. One nest contained refuse of old cocoons, one of the latter presumably that of a parasite. Another revealed three small pupal shells of a muscoidean fly and one decaying adult wasp and pupa, while the empty cells had been used at one time. In one nest, however, were two large cells, one containing two Hesperid larvae and the other a Hymenopterous grub. The Lepidopterous larva was probably that of *Pholisora catullus,* which was common in the vicinity. No wasp was taken at this nest, but the latter was one of several tunnels constituting what appeared to be a loose colony of *Odynerus geminus.*

A glance at Plates XV and XVI will show that there is some variation in the nests as regards the number of cells, and the length of the galleries. Some contained as many as eight cells, but in all cases the tunnel starts vertically and may lead to cells at one or more points. As with *O. annulatus* their holes are very neat and smooth, often somewhat widened where branching begins. The diameter of the entrance to the chambers is at this point about one-half that of the enlargement. Some of the holes were frequented by males which, entering them now and then, basked inside the entrance.

A brief comparison of the nest habits of *O. annulatus* and *geminus* may be of interest.

1st. *Annulatus* and *geminus* occur in the same locality but differ somewhat widely in habits, for:

2nd. While *annulatus* constructs a tube over its nest, *geminus* does not.

3rd. *Annulatus,* in disposing of the unused earthen pellets extracted from its burrow, deposits them at a distance of several feet from its nest; *geminus,* on the other hand, drops at least a good proportion of the pellets only an inch or two from its burrow.

4th. *Annulatus* provisions its nest with the larvae of *Loxostege sticticalis* (Pyralidina), *geminus* with the larvae of *Pholisora catullus* ? (Hesperidae), although the larvae of *sticticalis* was common in the locality frequented by *geminus.*

What advantage the clay tube constructed by *O. annulatus* has over the plain unadorned shaft of *O. geminus* is difficult to explain. Apparently and logically the conditions that would favor the tubed nest would appear to be harmful to a tubeless nest, both situated in similar localities, or vice versa. Would the tube serve as a protection against dust and floods, or to lessen the often intense heat of the plains within the nest? A more plausible explanation for the tube-building habits of *annulatus* would be that the clay device protects the nest from the attacks of insect enemies. Certainly the tube nests are less easily discerned than the plain holes with a small heap of pellets in the immediate vicinity. A Mutillid, for example (which

insects are very abundant in this region) would not be as likely to climb up the clay tube. Perhaps again, *O. annulatus* constructing fewer cells than its near relative, it would be imperative that these should be better protected.

Odynerus foraminatus Sauss.

Oberlin, Decatur County, July 19, 1910.

Several of these Eumenids were dug out of the same stump as *Crabro interruptus,* previously referred to. The cells of *foraminatus* were larger than those of *Crabro* and separated by partitions of mud, instead of wood chips as in the case of the latter insect. The brood was apparently just emerging, but what their burrows had been provisioned with was not ascertained.

Family Vespidae

Polistes variatus Cresson, Trans. Am. Ent. Soc. IV, 247, 1872.

A number of specimens of this wasp were taken near Atwood, Rawlins County, in July. Trees and houses being rather scarce in Northwestern Kansas, the nests of these insects can be found suspended in the tunnels of rodents, exposed by erosion, in the face of cliffs. Such a nest was found five or six inches inside a shallow pocket in a bank. The five adults pertaining to this nest were taken. The comb consisted of thirteen capped and a large number of open cells, the latter surrounding the former.

The genus *Polistes* is well represented in Kansas by at least eight species; these are commoner, however, in the eastern half of the state. During the late fall females are often found indoors in their instinctive efforts to secure a comfortable place for hibernation.

Series ANTHOPHILA

Family Andrenidae

Halictus occidentalis Cress.

Rarely met with. We dug out a tunnel of this species from a clay bank in Wallace County. The hole went straight down for 14 inches and ended in three pockets filled with pollen.

Family MEGACHILIDAE

Anthidium maculifrons Smith.

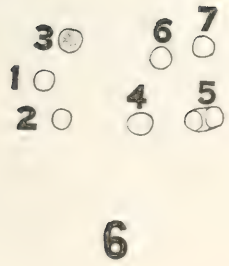
From Wallace, Cheyenne, Rawlins, Wichita and Gove Counties.

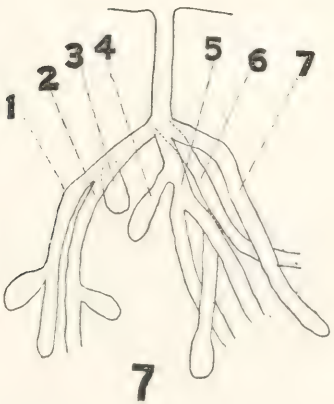
Two females of this bee were observed nesting in a bank of coarse quartz sand, near a colony of bembecid wasps. One *Anthidium* had a practically horizontal tunnel five or six inches long, that of the other was about ten inches long and likewise subhorizontal. At the end of the shorter galley the mass of brown pollen was enveloped in a woolly material which seemed to be the tomentum from thistle stems (*Cirsium*), while the pollen in the deeper tunnel was surrounded by some sort of soft pappus, perhaps from the inflorescence of *Cirsium*. This habit of securing cottony material for nidification appears to be a common one in the genus *Anthidium*, as several European species as well have such habits. (See Cambridge Natural History, VI, Insects, Pt. II, 45-6, 1899.)

Dianthidium concinnum (?) Cress.

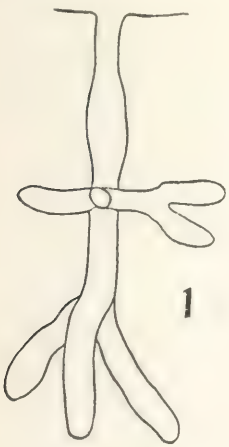
Three females from Sheridan, Cheyenne and Greeley Counties, July and August. Nests were found on twigs in Sheridan, Cheyenne and Lane Counties, and at least that found in Sheridan County belonged to *D. concinnum* (?), since the insect was taken from one of the cells. There is, in addition, a nest in the collection from Beaversville, Okla. (April 28, 1905, C. O. Tannehill, Lot 906), which undoubtedly is the work of *Dianthidium*.

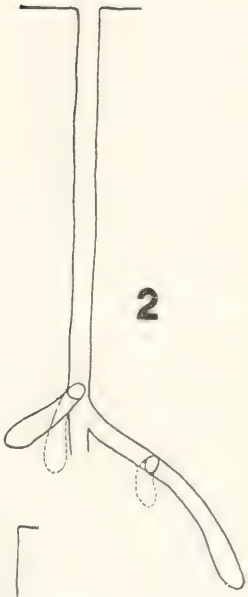
The nest of this insect is composed of pebbles glued together with a resinous cement, which may be derived from the stems of *Helianthus* which are often infested with a small lepidopterous borer that causes an exudation which usually attracts a host of Hymenoptera. The cells of the nest are provisioned with pollen and closed by the adult. (See Plate XIV, fig. 3.) These neat little structures can sometimes be discerned from a distance on twigs when brought up against the skyline. Two nests were found on trees, one on a *Salix*, the second on a *Cerasus*, while the third was on a tall dry mustard plant (*Brassica*).

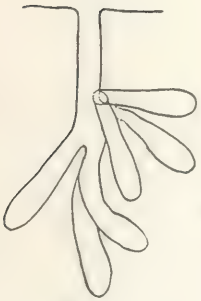




BIOLOGY OF HYMENOPTERA - HUNGERFORD & WILLIAMS.







BIOLOGY OF HYMENOPTERA—HUNGERFORD & WILLIAMS.

Sharp (Cambridge Nat. Hist., VI, Insects, II, 47, 1899) speaks of *Anthidium septemdentatum* of Europe using resin as its working material, and an old snail shell for its nest.

Dianthidium curvatum Smith, Syn. ***interruptum*** Say.

One male and one female from Sherman and Thomas Counties, July.

The genera *Anthidium* and *Dianthidium* differ from each other not only in structural characters, but likewise in habits (that is, as far as we know of the habits of these bees). Cockerell in his Rocky Mountain Bees (Univ. of Colo. Studies VII, No. 3) separates them thus:

"No pulvillus; cottony material used in preparing nests, which are burrows—*Anthidium* Fabr. (P).

"Pulvilli present; nests made of resin, on rocks, etc.—*Dianthidium* Ckll. (P)."

Megachile sp.

Several bees of this genus were observed nest building. One used a burrow in a sand bank. The hole was five or six inches long and contained the usual leaf nest, somewhat over two inches in length and of several cells.

Megachile sometimes invaded our tent in search of a suitable nesting place. One of these bees chose a cork-lined cigar box loosely filled with cotton and built her nest along the edge of the cork and side of the box.

The following are our observations on a species of Leaf-cutting Bee. Atwood, July 23, 1910:

On July 23 a bee was observed carrying bits of leaves from a rose bush to some spot between the folds of one of the blankets at the camp. It was an interesting thing to watch this bee at her work. Alighting on a leaf and opposing herself to the edge of a leaflet she would begin cutting, working her mandibles like a pair of scissors. In five or six clips she would have a portion of the leaflet smoothly cut and neatly rolled into a cylinder, and with this held by her feet beneath her she would fly away to the blanket. Several trips were

watched, then she was left to her work. By 5 P. M. she was not coming to the blanket, so the cell she had constructed was located. It was attached to a fold of the blanket. It was nearly one inch long and something less than half as wide, made of 42 leaf bits overlapping each other and quite firmly held together. Within the little chamber there was a mass of pollen larger than a pea, and as the cell was not closed evidently the work of collecting pollen had not been completed.

Family ANTHOPHORIDAE

Melitoma grisella Ckll. & Porter, Syn. *dakotensis* Ckll. & Porter.

This bee (Pl. XVI, fig. 6) which we have found rare in Kansas, has heretofore been taken in this same State by Dr. Snow, who took one male in Wallace County, in 1877 (No. 839). Six additional specimens, 2 ♂♂ and 4 ♀♀, were secured during July and August, 1910 in Rawlins, Cheyenne and Greeley Counties. (A few were found in Grant County the subsequent year).

The nesting habits of this insect were observed to some extent. Near Atwood, in Rawlins County, the tunnel of *grisella* was found in a clay bank. It was five or six inches in length, inclined slightly downwards, quite smooth and forked near the end, each branch terminating in a polished cell, stuffed with a mass of yellowish-white pollen. The bee constructs a long arch or semi-tube of clay, which is secured along the bank, and has its upper end terminating at the tunnel. The arch observed at Atwood and which is figured in Plate XIV, figs. 1 & 2, was an inch and a half in length, of rough exterior and smooth interior.

In Cheyenne County, in the extreme northwest corner of the State, a small and rather dilapidated colony of *M. grisella* was located in a little gully near Republican River. Here three clay arches were seen, with a fourth being constructed or repaired by a bee. Some old deserted holes here, evidently belonging to this species, were being utilized by the Crabronid (*Trypoxylon texense*), which stored spiders in them.

As in *Anthophora occidentalis,* some of the tunnels were not adorned with a clay device. It seems to us more rational to consider these semi-tubes more for protection against predaceous insects or parasites (as Bombyliid flies, which we do not imagine would as readily discover the lateral entrance to the *Melitoma* burrow as they would an unprotected face tunnel), than for shelter against moisture. The Hymenoptera of the plains are very much subject to the attacks of parasites. The fact that some clay tubes constructed by Hymenoptera, notably *Odynerus,* are often quite vertical would not favor the "protection against moisture theory," though they would offer considerable relief against dust and sand.

Anthophora occidentalis Cresson.

Anthophora occidentalis, the "Larger Tube-Building Cliff Bee," is a stout-bodied solitary bee found in large colonies inhabiting clay cliffs. Their tunnels are three-eighths inch in diameter and extend into the bank about eight inches where they end in several cells. These cells are provisioned with pollen and are so made that when dug out they came from the gallery as separate urn-shaped clay nodules of uniform size. (Pl. XV, fig. 3).

The entrance of the tunnel is protected by a curved clay tube of from three-fourths to two inches in length. (Pl. XV, figs. 1 & 2). These tubes bend downwards and very often the top or outer curve is split longitudinally, (probably sun cracked) making the tube resemble the moulted skin of a *Cicada* as it hangs on a tree trunk. Where the tubes were absent from the tunnels, as was often the case, it appeared to be a matter of accident. Viewing the face of a cliff in which there was a colony of these bees, the unprotected holes were the only marks of its presence, the ones protected by the tubes being not at all conspicuous. This may or may not be the reason for the tubes.

As to the life history of these bees, each female has her own burrow. The egg is laid in a cell provisioned with pollen. We found larvae and pupae in cells, June 20th. It was in colo-

nies of these bees that the new species of Meloid beetle, *Hornia gigantea* (Wellman) was found.* In noting the devastation of this parasite upon one colony of the bees it was evident that the colony was at one time apparently a large and prosperous one of four or five hundred individual insects; but now presented a delapidated appearance, for where dozens of flying bees should be expected, only an occasional specimen was seen. An examination of the cells disclosed many parasites.

Explanation of Plates.

Plate XIV.

All about natural size.

Fig. 1. Horizontal section through tunnel of *Melitoma grisella.*

Fig. 2. Dorsal view of clay arch over entrance to tunnel of *Melitoma grisella.*

Fig. 3. Nest of *Dianthidium* sp.

Fig. 4. Vertical section through tunnel of *Crabro interruptus.*

Fig. 5. Vertical section through tube and tunnel of *Odynerus annulatus* (W).

Fig. 6. Vertical section through tunnel of *Odynerus annulatus* (E).

Plate XV.

Fig. 3. Slightly enlarged, other figures slightly reduced.

Fig. 1. Clay tubes of *Anthophora occidentalis.*

Fig. 2. Lateral view of one of the clay tubes of same.

Fig. 3. Clay cell of *Anthophora occidentalis* showing aperture from which the beetle, *Hornia gigantea* Wellman has emerged.

Fig. 5. Vertical section through main shaft of a burrow of the wasp, *Odynerus geminus,* showing the smaller apertures to the branches.

Fig. 6. Horizontal section through the lower half of Fig. 7.

Fig. 7. Vertical section through the burrow of *Odynerus geminus,* with those branches and cells out of the vertical plane brought in.

Plate XVI.

Figs. 1, 2, 3 and 4. Vertical sections through the burrows of *Odynerus geminus,* with those branches and cells out of the vertical plane brought in. Reduced.

Fig. 5. *Trypoxylon texense.*

Fig. 6. *Melitoma grisella.*

Fig. 7. *Loxostege sticticalis.*

*See Ent. News, XXII, pp. 15-17, Jan., 1911.

A new Variety of Rihana (Cicada) sayi Grossbeck (Hemip.).

By Wm. T. Davis, Staten Island, New York.

Through the courtesy of Mr. J. Chester Bradley, of Cornell University, I have examined a number of Cicadas from Georgia, collected principally by him. Among them are 18 examples of *Rihana sayi* Grossbeck, described in Entomological News for April, 1907. Ten of these are of the type usually found in the Middle States, namely with the lateral and posterior margins of the pronotum nearly all black with a green spot on each side of the center of the latter. In the author's collection there are 86 examples from New York, New Jersey, Ohio, North Carolina and Rabun Co., Ga., that follow this pattern quite closely; in several, however, the posterior margin of the pronotum, or collar, is wholly black.

There is a southern race more green in color than typical *Rihana sayi* which may be called

australis n. var.

In this the pronotum is nearly all green, the two black triangular spots near the anterior margin are reduced, the collar is green, touched with black at the lateral angles, and is narrowly margined in front with the same color. There is also a black line in the center about 1 mm. broad. The mesonotum is green, fulvous and black.

Typical examples are from Albany, September, 1910; Bainbridge, July 1909, September, 1910 and Spring Creek, Decatur Co., June, 1911; all collected by Mr. Bradley in Southern Georgia.

Fresh specimens of this variety are quite beautiful in color. Two examples from Atlanta and one from Austell, Ga., approach the variety, but lack the green on the thorax. One of the 86 specimens mentioned above, and collected on Staten Island, N. Y., has the collar nearly all green, but lacks the green on the thorax.

By way of recording distribution it may be well to state that Mr. Bradley's collection contains two *Rihana davisi* Grossbeck, from Atlanta, Ga., September, 1909, and August, 1910, and two *Rihana engelhardti* Davis, from Atlanta, Ga., July, 1910.

Of most interest is a male *Rihana similaris* Grossbeck, from Bainbridge, Ga., September, 1910. The only other recorded specimen is the type from Fernandina, Florida, in the collection of the United States National Museum. This species closely resembles *Rihana lyricen*, but differs greatly in the genitalia of the male. We also note the longer opercula, which extend to the third abdominal segment as mentioned in the original description. In the Georgia specimen the inner half of each operculum is dark colored and the band of black on the ventral surface of the abdomen is broader than in any of the *lyricen* examined.

Two new species of African Eumastacinae (Orth.).

By James A. G. Rehn, Philadelphia, Pa.

Brachytypus burri n. sp.

Type: ♀ ; Mossamedes Province, Angola. Acad. Nat. Sci. Phila., type no. 5184.

Closely related to *B. insularis* Burr* from Sokotra, but differing in the much larger size and proportionately smaller pronotum. From the remaining species of the genus, *B. rotundifrons* (Burr) from Mombasa, the new form can readily be separated by having the metanotum exposed.

Size medium; form strongly compressed. Head well seated in the pronotum; vertex very steeply declivent and gently passing into the frontal costa, lateral margins of same slightly compressed dorsad of insertion of antennae and regularly converging ventrad of the same, frontal costa and contiguous portions of vertex rather deeply sulcate; antennae hardly longer than the eye, eleven-jointed; eyes subovate in outline, slightly longer than the infra-ocular portion of the genae, not at all prominent.

Pronotum with the greatest length contained nearly one and one-half times in the greatest (caudal) depth of same; dorsal carina moderately arcuate, ascending caudad; cephalic margin obtuse-angulate, caudal margin moderately emarginate mesad; lateral lobes with the ventral margin oblique sinuate, ventro-cephalic angle very faint, ventro-caudal angle marked, nearly rectangulate, caudal margin of lobes slightly arcuate dorsad and ventrad, nearly straight in the middle.

*Bull. Liverpool Mus., II, No. 2, p. 44.

Mesonotum with dorsal margin projecting caudad of pronotum nearly half the dorsal length of the latter.

Metanotum surpassing the mesonotum by slightly more than half the length of latter.

Proximal abdominal segment compressed cristato-carinate as in the thoracic segments, exposed portion equal to that of the mesonotum; remaining abdominal segments not elevated and hardly even carinate dorsad.

Cephalic and median limbs rather short. Caudal femora compressed, robust, dorsal carina with eight spiniform serrations becoming elongate spines distad, spine on dorsum of genicular region decided, caudal extremity of genicular arches and genicular lobes spiniform, remaining femoral carinæ simple; caudal tibiæ armed with fifteen spines on each margin.

General color (specimen mounted from alcohol) clay color, eyes ochraceous, limbs washed with broccoli brown; genicular arches, tips of spines on dorsal carina of caudal femora, genicular region of caudal tibiæ and an area on the keel of the mesonotum blackish; tibial spines black with yellow bases.

MEASUREMENTS.

Length of body	18.5 mm.
Length of pronotum	6.5 mm.
Greatest (caudal) depth of pronotum	9.5 mm.
Length of caudal femur	11.8 mm.

Four paratypic females have been examined in addition to the type. One specimen is slightly below the average size of the remainder of the series, but otherwise no points of difference are noted.

We take pleasure in dedicating this species to Dr. Malcolm Burr, the eminent English Orthopterist, in token of appreciation of his valued work on the Eumastacinæ.

Thericles macropygia n. sp.

1904. *Thericles gnu* Rehn (not of Karsch, 1896) Proc. Acad. Nat. Sci. Phila., 1904, p. 676. (Luebo, Congo.)

Type: ♂ ; Luebo, Congo. (D. W. Snyder.) [U. S. N. M.] Allied to *T. zebra* Gerstaecker, described from the Cameroons, but differing in the more produced ventro-caudal angle of the lateral lobes of the pronotum, the much more recurved and inflated apex of the male abdomen, the more elongate subgenital plate of the same sex and the slightly greater size.

Having recently had an opportunity to examine a topotypic female specimen of Karsch's *T. gnu,* I find the Luebo individuals to be quite distinct, the female sex of the new form differing in the characters previously noted (*vide supra*) and also in the strongly compressed frontal costa, the margins of which are contiguous through nearly their entire length.

The female which we have associated with the male type shows some affinity with *T. quagga* Karsch and *T. depressifrons* Bolivar, both known only from the female sex, but the coloration, which is of great importance in the Eumastacinæ, shows a number of differences.

♂ Size small; form distinctly compressed; surface of dorsum of thoracic and proximal abdominal segments finely rugulose.

Head with the dorsum considerably elevated dorsad of that of the pronotum, when seen from the side subobtuseangulate at the highest portion of the eyes, fastigium decidely declivent, rounding into the decidedly retreating facial line, the latter slightly concave; occiput with distinct median and strongly divergent lateral carinæ, the lateral ones contiguous between the eyes and passing into the almost entirely contiguous carinæ of the frontal costa, the latter very slightly separated for a short distance on the fastigium; antennæ but little longer than the depth of the eye; eyes very large, moderately prominent.

Pronotum with the dorsal carina distinct but not elevated; lateral lobes of pronotum about as deep as long, cephalic margin strongly arcuate ventrad, ventro-cephalic angle obtuse, ventral margin arcuato-emarginate cephalad, ventro-caudal angle slightly produced, well rounded.

Thericles macropygia n. sp.—Lateral view of apex of abdomen. X10.

Proximal abdominal segments carinate; apex of abdomen strongly recurved, subinflated; supra-anal plate with a pair of mesially constricted carinæ, apex subtruncate; cerci elongate, styliform, apex blunted; distal ventral abdominal segment bullate, the outline regularly arcuate when seen from the side; subgenital plate elongate, sub-cylindrical, the apical margin slightly produced laterad and regularly arcuate in shape, when seen from the side distinctly depressed distad.

Caudal femora very considerably

exceeding the apex of the abdomen, moderately robust, median carina well spined, dorso-lateral carina with six spines, genicular lobes and median and lateral angles of the genicular region well spined.

General color black, variegated with saffron yellow as follows: a narrow medio-longitudinal line from the fastigium to the curve of the abdomen, also continued over the face to the clypeal suture, slightly expanding on the ventral section of the face; the two proximal antennal joints and a broad, oblique subocular bar on the genæ, a narrow bar along the cephalic margin of the lateral lobes of the pronotum, a broad patch on the caudal section of the same lobes, involving a portion of the mesonotum, and the median and distal portions of the abdomen margined with the paler color. Cephalic and median limbs saffron yellow, becoming subrufescent on the feet. Caudal femora ochraceous with the carinal spines and the genicular extremity, except the median carina and a distinct yellow margining to the genicular lobes, black. Antennæ except the two proximal joints brownish.

Measurements.

Length of body	11.5 mm.
Length of pronotum	2.3 mm.
Length of caudal femur	9.2 mm.

♀. The female specimen which we have associated with the male type differs from it only in such characters as are essentially sexual and in the color, aside from the number of spines on the dorso-lateral carinæ of the caudal femora being five instead of six.

The ovipositor jaws have the teeth quite robust, while the supra-anal plate has the paired carinæ much as in the male.

The general color was probably yellow (much altered by immersion in spirits), the cephalic and median limbs and distal half of the caudal femora, exclusive of a yellowish line on the median carina of the genicular region and the margins of the genicular lobes, and the greater portion of the caudal tibiæ black. The pre-genicular region of the caudal tibiæ is indistinctly glaucous and the distal extremity and the bases of the spines of the same are more or less yellowish. The antennæ are colored as in the male.

Measurements.

Length of body	17. mm.
Length of pronotum	3.3 mm.
Length of caudal femur	11.5 mm.

The pair described above are the only representatives of the species seen by us.

Vulturopinae, a new Subfamily of the Psocidae; type Vulturops gen. nov. (Platyp., Corrod.).

By Charles H. T. Townsend, Piura, Peru.

The following very interesting insect was found by me some time ago in Piura, in north-western Peru. It evidently forms the type not only of a new genus but of a new subfamily. New forms of the lower and more primitive types of insects, like the present, coming from the west coast region of South America, possess a greatly added interest from the fact that they will quite certainly throw much light on early land connections between South America, Africa and Australasia, when the faunas of all three regions shall have been more thoroughly investigated.

Aside from the novelty of this form, and the biogeographic interest attaching to it, it is remarkable as being termitophilous in habit. In view of all these facts, I venture to describe it for the purpose of record.

Vulturopinae new subfamily.

Differs from the Psocinæ as follows:—

A pair of subanal cerci present, with a tubercle just above them; these and end of abdomen with hairs. Abdomen subglobular, apparently of ten segments; thorax and abdomen stout, rather suggestive of the form of *Sminthurus*. Only one pair of wings developed, the anterior pair, the costa and veins heavy and sparsely set with long curved spine-like bristles; posterior wings atrophied, calypter-like or mere pads.

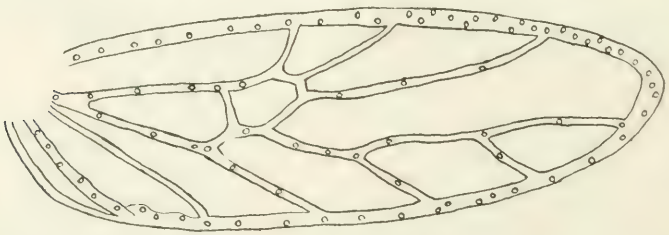


Fig. 1.—*Vulturops termitorum* n. sp.—Right anterior wing, upper surface, the bristles all detached.

Venation and form of wing unlike any of the Psocinæ (see figure 1); one six-sided discal cell present, bounded by six cells which are contiguous to it. Wings non-functional as to flight. All the legs long but hind legs especially elongate, fitted for jumping; the hind tibiae very long, twice as long as others. Larva and nymph with only two tarsal joints, adult with three. First tarsal joint very elongate, others subequal and very short. Coxae all elongate but especially so the hind coxae, which are much larger and longer than the others. (The hind coxae seem to fit into an elongate vertical pleural furrow.) Tibiae and tarsi spined, femora with only fine hairs. Jumps like the Collembola.

Type, the following new genus:—

Vulturops gen. nov.

Face in profile like a vulture's beak with large fleshy protuberance at base; this appearance is due to the large, wide, rounded, convex facial tubercle, which is present as well in both larva and nymph. Crown of the head with long bristly hairs, covering also upper portion of facial tubercle. Eyes

FIG. 2.—Mandible. *Vulturops termitorum* n. sp.

Fig. 3.—Maxillary fork (Greatly enlarged.)

facetted, no ocelli. Antennae with bristly hairs, about 25-jointed, last thirteen joints shorter than others, scape thickened, Mandibles strong, combining certain characters of *Troctes* and *Peripsocus*. Maxillary forks trifid, long, not stout, slightly curved (see figures 2 and 3). Maxillary palpi 4-jointed, much like those of *Peripsocus californicus;* the terminal joint flattened, spatulate, truncate and widened apically. Labial palpi 2-jointed, the terminal joint appearing somewhat flattened. Oesophageal sclerite and lingual glands rather similar to those of *P. californicus*.

Neck serrate above in profile, showing about eight or more notches and teeth. Prothorax reduced, shortened and narrowed; mesothorax and metathorax successively larger, both very high, about as wide as base of abdomen; all three divisions of thorax short. Nymph with abdomen and thorax quite same as in adult, and hardly to be described as thysanuriform. Larva and nymph not so bristly as adult, and showing no anal cerci. One adult shows a globular bladder-like sac attached to venter.

Wings (anterior) hemelytral both in appearance and function, about three times as long as wide, with strong heavy veins and complete strong costa extending entirely around border, appressed to the abdomen which they cover except anal end when abdomen is much swollen. One closed basal and one discal cell present; five longitudinal veins. Nymph with wings pad-like; larva without trace of them. Venation faintly visible in nymph.

All the tibiæ with a pair of apical spurs. Tarsi 3-jointed, with a terminal pair of claws. The first tarsal joints not so strongly elongate in nymph as in adult. A pair of minute short spines on inside of middle of last tarsal joint of both larva and nymph shows where the joint becomes divided in adult into two joints.

Other characters as given above under family heading.

Type, the following new species:—

Vulturops termitorum sp. nov.

Length, about 1.25 to 1.5 mm. Color pale grayish-whitish, shading to straw-color on head and anal end of abdomen, mandibles and mouth parts more or less of deeper color. The wings, antennae, tibiae and tarsi with a fuscous shade, due to the armature of dusky bristles. Eyes brown.

Type and cotypes deposited in U. S. N. M.

Found in covered runways of *Hamitermes* sp. (det F. Silvestri) on outside of post, under house, Piura, Peru, January 18, 1911. Nine specimens, one being a larva, one a nymph, and seven adults. An adult was found at Payta, Peru (on the coast), January 3, 1911, indoors, where it had probably issued from termite galleries. Occasional individuals have since been found indoors at Piura, where all houses are badly infested with termites.

The curious wings of this form, quite unlike any flight-functioning wings known, both in their shape and in their veins, costa and bristle characters, are evidently functional as protectors of the soft globose abdomen. That such is the case is indicated by the erect curved bristles that spring from their upper surface. They have no doubt been developed in accordance with the termitophilous life-habit of the insect. This explains also why only the anterior wings are developed, while the posterior pair is atrophied and without any function whatever.

It may be said in this connection that search in South Africa for termitophilous Corrodentia should yield important results, since in that region termite evolution reaches its acme and the other forms of life bear much affinity with those of Australasia and South America.

The drawings were made with camera lucida, by Miss Helen T. Townsend, from mounts.

Additions to the Insect Collection of the American Museum of Natural History.—Mr. C. W. Leng has put his valuable collection of "long horned" beetles at the disposal of the American Museum of Natural History, New York City, for use in filling gaps in its collections. This means a gift of some 870 specimens covering nearly 300 species not hitherto acquired. Mr. John A. Grossbeck, who has been specializing for some time on the Geometridæ, has given to the museum his entire collection of these moths in addition to the series previously donated.—*Science*, April 26, 1912.

ENTOMOLOGICAL NEWS.

[The Conductors of ENTOMOLOGICAL NEWS solicit and will thankfully receive items of news likely to interest its readers from any source. The author's name will be given in each case, for the information of cataloguers and bibliographers.]

TO CONTRIBUTORS.—All contributions will be considered and passed upon at our earliest convenience, and, as far as may be, will be published according to date of reception. ENTOMOLOGICAL NEWS has reached a circulation, both in numbers and circumference, as to make it necessary to put "copy" into the hands of the printer, for each number, four weeks before date of issue. This should be remembered in sending special or important matter for a certain issue. Twenty-five "extras," without change in form and without covers, will be given free, when they are wanted; if more than twenty-five copies are desired, this should be stated on the MS. The receipt of all papers will be acknowledged. Proof will be sent to authors for correction only when specially requested.—Ed.

PHILADELPHIA, PA., JUNE, 1912.

Up to the date of reading the second proofs of the present number of the NEWS (May 22), 84 North American entomologists have sent in their ballots that the law of priority in nomenclature should be strictly applied in all cases. On the other hand 173 North American Entomologists have informed us that they vote against the strict application of the law of priority in all cases and express the desire that the most important and generally used names should be protected against any change on nomenclatural grounds.*

In our July number we propose to print the names of those in favor of each one of these alternatives. In the meantime we hope to receive votes from others who have not yet responded to our invitations to take part in this "preferential ballot." Some additional contributions to the discussion of the nomenclature question will be found under the caption "Notes and News," on another page.

As the Editor expects to be away from Philadelphia during the summer, part of the time in attendance on the International Congress of Entomology at Oxford (where he hopes to see many of his American colleagues), all communications respecting the NEWS should be addressed to the Associate Editor, at the Academy of Natural Sciences, from June 15 to October 1, 1912.

*The *Zoologischer Anzeiger* for April 10, 1912, page 365, announces the result of the votes of the German Zoologists (see the NEWS for May, p. 227) as 11 for, and 115 against, strict priority.

Notes and News.

ENTOMOLOGICAL GLEANINGS FROM ALL QUARTERS OF THE GLOBE.

Strict Priority in Nomenclature—or Not?—It is not without misgivings that I signed the statement favoring *nomina conservanda*. I signed it because it clearly means, not sanction to individual initiative in the adoption or rejection of names, but mutual agreement expressed through properly constituted official action. My misgivings grow out of two considerations: One, in the present unintegrated state of organization of biological science there is no satisfactory means of getting opinion. I take it, this referendum vote, now proceeding at home and abroad, will show how far existing nomenclatural agencies have come from representing the opinion of zoologists at large. Two, the proposal, if successful in allaying the most pressing causes of present confusion, may tend to perpetuate the burden of nomenclature, which would still be too grievous to be permanently borne.

I am moved to sign the statement by these considerations: The confusion is growing ever more confounded with divers and sundry applications and extensions of the law of priority, and I would like to see saved: (1) Names of genera that are types of families, thereby saving the family names. (2) Names of genera that are bound up with important monographs, and that must continue in use in morphology, ecology, or other branches of biology. (3) Names of species well known in popular literature, in dealers' catalogues, etc.

In the second place, I think that the names likely to be thus conserved are those that no rational body would wish to sacrifice under any plan, and in the third place, I shall live in the hope that there may come another lucid interval when further progress by mutual agreement may be made.—James G. Needham.

I am giving my preference for strict priority. It is a bit unfair to have the question put in such an unqualified way because the nomenclatural commissions of succeeding zoological congresses have not stood by the code as originally devised. Every change and qualification that has been adopted has simply made matters worse by introducing contradictions. If at every congress the rules are going to be changed it will be much better to ignore them and follow the dictates of one's own conscience. I am for a logical and sane application of priority. I cannot accept genera without species, like Meigen's of 1800. These must date from the time they had species included in them and be credited to the person who first did so.

A word regarding your list of names to be conserved in the last number of the News. As I have understood it, these lists are solicited from "specialists" in their respective groups. Some of us who are working in these groups and are confronted by some of these names

almost daily have a right to know who these "specialists" are. The aim, I believe, is to preserve generic names that have been in constant use regardless of priority. But, to take an example from your list what is done in the case of *Corethra*? The name as it stands in that list is not in the sense in which it has been generally used. There is a large classic literature on *"Corethra"* in the opposite sense (that is, with *plumicornis* as type) which is very familiar and very important to those who are something more than systematists. Moreover, I am not aware that anyone has checked up Mr. Coquillett's results regarding the status of this genus. Again, take the genus *Stegomyia*. The concept of this genus is an absurdity. It was made to include species which are unrelated and which are united on mere colorational similarities. But the name gained great popularity because it was applied to the species of mosquito proved to be the transmitter of yellow fever. Medical literature, entomological literature, and above all popular pseudoscientific literature, immediately became flooded with mentions of *"Stegomyia fasciata"* and "the Stegomyia." Evidently the standing of the genus from the scientific standpoint means nothing to these conservators, the fact that it has been much used makes its retention imperative! Incidentally, the type of the genus is *Culex fasciatus* Fabricius. We shall soon arrive at the point where there will be zoologists and nomenclaturists; it will then be better to let these latter go their way.—Frederick Knab.

[The statement of the alternatives on which we have been asking votes was adopted verbatim from that on which the Scandinavian and German naturalists voted, for the sake of a uniform international vote. The responsibility for the generic names of Diptera published in the May News, pp. 229-232, rests entirely with Dr. Stiles and his coadjutors. The list was referred to in our May editorial in illustration of a method by which an interational selection of *nomina conservanda* might be made, but we do not presume to say whether the types have or have not been correctly determined. That is for the Dipterists to decide.—Ed.]

It occurs to me that the method applicable to one group might not be advantageous when applied to others. Would it be practical to assign some future date as a date from which well established names (I refer to generic names) should not be changed on grounds of priority from obscure and remote sources? For example, in ornithology, say in five or ten years, names of general and unquestioned use up to that time, should not be changed. In sciences dealing with more obscure groups which have received a more limited study, possibly the time should be longer, e. g., the time for fixing names of stone flies might be postponed for twenty-five years. I realize, of course, that the groups to which little study has been given have a limited litera-

ture, and relative exactness might be attained in a shorter time, but I have suggested this longer period because the limited literature of these obscurer groups may be the work of a very few individuals, and others should have a chance to pass on the names. If there is any hope of digging up all the names in the next twenty-five or fifty years, I am in favor of strict priority, but if this unearthing is to go on indefinitely I am in favor of making exceptions to the strict application of the law. As a matter of fact I don't believe these changes in nomenclature bother anybody much but those making them. The long-suffering morphologist, who, we are given to understand, is at a loss to name the one species he is working on, can usually settle his trouble by writing one letter.—E. B. Williamson.

At one time I was greatly in favor of the retention of certain generic names which were of primary importance in economic entomology, that is to say, such names as had been adopted by non-entomologists as common names of insects. However, since the movement along this line has reached the point where it seems to be merely a movement for the preservation of all names now in common (systematic) use, I have changed my mind, and am strictly for the law of priority. In cases such as I have mentioned the economic entomologists could well use the preoccupied name in their literature and it would make no difference at all to the systematist, as he would know the synonymy and could record the records in the proper place. This would allow the use of such names as Stegomyia in economic and popular literature and still allow the systematist to use the correct name.—J. C. Crawford.

The above expresses my sentiments so well that I wish to subscribe. —H. L. Viereck.

As one who has given a great deal of attention to this matter, I wish to say that there is no rule which is not open at times to exceptions, and that in the interest of a stable nomenclature there should be power vested in the Commission on Zoological Nomenclature created by the action of past Zoological Congresses and in the Commission on Nomenclature of the International Entomological Congress, by a unanimous vote, in a certain limited number of cases, to adopt a name which has been current, say for a century, as the generic designation of a well-known form, even though antiquarian research may show that some obscure writer in some obscure journal may have applied to that form another name. The number of such cases is in my judgment extremely limited. There are, however, a few of this sort. I am thoroughly in sympathy with the thought of those who clamor for a fixed and stable nomenclature. I think, however, that the difficulties which they foresee as likely to arise by the enforcement of the law of strict priority are

exaggerated. It is, in my judgment, of fundamental importance as soon as possible to have these disputed questions settled authoritatively for all time, and the creation of the Commissions already alluded to, in my opinion, is a step in advance, which has been taken none too soon. We are providing in these Commissions a court of last appeal, and their decisions should be accepted and adopted universally. No class of biological students is confronted with a huger and more entangled nomenclature than are students of entomology. As we all know, there are more living forms belonging to the class *Insecta* than belong to all the other classes in the animal kingdom combined. Thousands of new generic names have been created within the last decade for *Insecta*. The nomenclature is increasing so rapidly and so large a number of students are engaged in investigating the nomenclature of the past that it is no wonder that men who have not access to large libraries and all the existing apparatus for determining disputed questions are at times somewhat bewildered. I trust that a conscientious resolve will be formed by all working entomologists to refer questions in doubt to the nomenclatorial Commission of the Entomological Congress, that having been passed upon by this body their decisions may be submitted to the decision of the Commission of the Zoological Congress, and that thus ultimately there may emerge, as the result of their combined efforts, an entomological nomenclature which will be accepted universally as final and therefore stable. In this work the law of strict priority will have to dominate, though as I have already intimated, there may be some possible exceptions in the application of this rule to be left for final adjudication upon well-established principles by the members of this Commission.

In this connection it may be said that it is eminently desirable that there should be some concerted effort made to establish a recognized series of rules or principles governing the matter of founding genera. Our camps are divided into two groups, as we all know, the "Splitters" and the "Lumpers." Both have their faults and their virtues. For my part, I have the feeling, which has been growing, that the "Splitters" have been entirely too active of late, and the results of their diacritical investigations have had entirely too much respect accorded them. The establishment of a new genus upon the basis of a slight modification in the neuration of a wing, the presence or absence of a tubercle on the epidermis of a larva at a given place, is something with which I confess I have no sympathy. This is, however, aside from the main question.

Let us by all means have a stable nomenclature. In my judgment, however, the only way to rightfully attain this end is by respecting the law of strict priority save in a very small and limited number of cases, which should be very carefully considered and acted upon.—W. J. Holland.

I AM AGAINST the strict application of the rule of priority, because there seems to be no end to the changes arising under it.

Take the birds of North America, some 700 species, if I remember rightly. The American Ornithologists' Union has had a committee working on them for over thirty years, and every supplement to the original check list has an increasingly large number of changes of names, owing to the application of this law. In fact, the common names of the birds have been stable, and the scientific ones unstable. Now, if a committee of experts working for thirty years on the birds of one country only cannot reach stability, by the application of this rule, how can we ever reach it in larger groups for the whole world?

I heartily agree with Mr. J. Chester Bradley's letter in the May NEWS.

Furthermore, I think that where anyone proposes a change of name of any species, that change ought not to go into effect, until a year after the proposer of the change has published his reasons for thinking the change ought to be made. I have seen names changed in one publication and changed back again in the next issue. I have seen a name changed by the discovery of a new name for the species in an obscure publication, and the change upset by further research in the very same book.

Lastly, I think a great many name changes, new species, sub-species and varieties are due at the bottom, simply to the unconscious vanity of the author who desires to see his name in print as much as possible. Let us all guard against too much subconscious cerebration of this sort.—C. S. BRIMLEY.

IT MAY NOT be amiss to call attention to the fact that much confusion in the nomenclature of insects is not due to the law of priority, but to entomologists who do not follow that law, to entomologists who follow *nomina conservanda*, conserving and using names that they know to be synonyms when the majority of their colleagues are following priority.

There is no way of enforcing any law in nomenclature. No principle of nomenclature ever had more support and authority back of it than the law of priority. Ever since 1842, every congress and code have stood by it; will *nomina conservanda* receive more support?

No one more than the specialist dislikes to change names; the change of *Conocephalus* to *Xiphidium* will be of more annoyance to Mr. Caudell and a few other systematists in Orthoptera than to all the professors of Zoology in the country. But in recent years many systematists have realized the truth of the statement made seventy years ago by a committee of conservative English Zoologists, "The

name originally given by the founder of a group, or the describer of a species, should be permanently retained to the exclusion of all subsequent synonyms." (Rule 1, Brit. Assoc. Code, 1842. Westwood, Waterhouse and Shuckard were the entomologists on that committee, later (1860) Stainton and Wallace concurred; Darwin was a member.) Therefore many are willing to do what systematists over and over again have neglected to do, to follow a principle rather than personal desire. Ten years ago I knew as well as I know to-day that *Parasitus* should replace *Gamasus* but in my Treatise on Acarina (1904) I did not change; now with practically all European acarologists using *Parasitus* I shall adopt it, though the change is much more annoying to me than to all the anatomists in the world.

The refusal of many Dipterists to use certain names is not because of priority but for an entirely different reason; generic names without species. In Lepidoptera dozens of genera and hundreds of species have been changed because of priority by all leading Lepidopterists. In Odonata both the Kirby and the Muttkowski catalogues (all we have) accept priority. That list of names of Diptera to be preserved is based on strict priority, while in the list to be excluded are many names which have been continuously in use for fifty years and more, and which almost all Dipterists would like to have conserved.

Nomina conservanda is an utopian dream, the substitution of personal convenience for a definite principle. What will be conserved? One wants this, another does not. No committee meeting now has any more authority than committees meeting ten, twenty or fifty years hence. They will be controlled by other zoologists with other desires, and conserve other names.

I learned to know a common dragon-fly by the name of *Plathemis trimaculata*. Can I have it conserved? I learned to know a scale insect by the name of *Mytilaspis pomorum*. Can I have it conserved? Yet all the changes possible in Apidae which Prof. Cockerell fears will not be of one half the annoyance to entomologists in general as was that change of *Mytilaspis pomorum* to *Lepidosaphes ulmi*. Hundreds of the worst changes in many groups are already in all degrees of acceptance. Will these be nullified? No! priority will hold and will always hold simply because it is a principle while *nomina conservanda* is simply personal desire. Much of the confusion in nomenclature arises from an entirely different source. One entomologist writes *Papilio ajax*, another *Iphiclides ajax*. This is the recognition by one of groups as genera which another entomologist will not recognize as of even subgeneric rank. Neither priority nor *nomina conservanda* will help this.—NATHAN BANKS.

Collecting in South America.—L. A. Williamson, E. B. Williamson and B. J. Rainey, of Bluffton, Indiana, left New York City by steamer on January 15th for British Guiana, and returned to New York March 19th. On their trip south their first stop was at Barbadoes, where they made only a brief stay, and from there they went to Georgetown, British Guiana, and with very slight delay struck into the interior, ascending the Demarara River sixty miles to Wismar, where they spent a few days in the collection of dragon flies, the main purpose of the expedition, which was organized by E. B. Williamson. From Wismar they crossed the country to Rockstone, on the Essequibo River, and collected flies for several days along that stream. Their next objective point was Tumatumari, on the Potaro River, about 150 miles from the coast, and in their collecting expeditions in that vicinity they ascended the river still twenty miles farther. From there they returned over about the same route to Georgetown.

From Georgetown the three gentlemen went to Paramaribo, the capital of Dutch Guiana, and also visited New Amsterdam in that country, adding to their collections at both points. This completed their collecting tour in South America and they then took a steamer to the Island of Trinidad, where they spent two weeks in collecting before they took up the return journey to New York.

They secured a total of about 4,100 dragon-flies, of 135 species, and in addition about 500 insects of other orders.

The dragon-flies secured in South America by Mr. Williamson will be added to a collection of about 23,000 he had made previously, which includes about 1000 species secured on former expeditions to many points in the United States, Canada, Mexico, and Central America.—*Bluffton Evening News,* March 21, 1912.

New Postal Regulations Concerning Insects.—[I enclose copies of Orders Nos. 6158 and 6242 of the Postmaster General, and call your attention especially to paragraphs 7 and 8. No. 8, you will notice, is a new section, No. 7 being modified from the old one. L. O. Howard.]

Office of the Postmaster General,
Washington, March 23 and May 3, 1912.

Orders Nos. 6158 and 6242.

Section 496, Postal Laws and Regulations, is amended by amending paragraph 7 and adding new paragraph 8, as hereinafter stated, and by renumbering old paragraphs 8, 9, 10, 11 and 12 as paragraphs 9, 10, 11, 12 and 13.

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7. Queen bees and their attendant bees, when accompanied by a copy of a certificate of the current year from a State or Government apiary inspector to the effect that the apiary from which said queen bees are shipped is free from disease or by a copy of a statement by the

bee-keeper made before a notary public or other officer having a seal that the honey used in making the candy used in the queen mailing cage has been diluted and boiled in a closed vessel; beneficial insects, when shipped by departments of entomology in agricultural colleges and persons holding official entomological positions; other live insects, when addressed to the Bureau of Entomology of the United States Department of Agriculture, to departments of entomology in State agricultural colleges, and to persons holding official entomological positions, and dried insects and dried reptiles may be sent in the mails when so put up as to render it practically impossible that the package shall be broken in transit, or the persons handling the same be injured, or the mail bags or their contents soiled.

8. Nursery stock, including field-grown florists' stock, trees, shrubs, plants, vines, cuttings, grafts, scions and buds (which may carry injurious insects) may be admitted to the mails only when accompanied by a certificate from a State or Government inspector to the effect that said nursery stock has been inspected and found free from injurious insects.

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FRANK H. HITCHCOCK, Postmaster General.

Entomological Literature.

COMPILED BY E. T. CRESSON, JR., AND J. A. G. REHN.

Under the above head it is intended to note papers received at the Academy of Natural Sciences, of Philadelphia, pertaining to the Entomology of the Americas (North and South), excluding Arachnida and Myriapoda. Articles irrelevant to American entomology will not be noted; but contributions to anatomy, physiology and embryology of insects, however, whether relating to American or exotic species, will be recorded. The numbers in **Heavy-Faced Type** refer to the journals, as numbered in the following list, in which the papers are published, and are all dated the current year unless otherwise noted. This (*) following a record, denotes that the paper in question contains description of a new North American form.

For record of Economic Literature, see the Experiment Station Record, Office of Experiment Stations, Washington.

4—The Canadian Entomologist. **7**—U. S. Department of Agriculture, Bureau of Entomology. **8**—The Entomologist's Monthly Magazine, London. **9**—The Entomologist, London. **14**—Proceedings, Zoological Society of London. **38**—Wiener Entomologische Zeitung. **44**—Verhandlung, K. k. zoologisch-botanischen Gesellschaft in Wien. **50**—Proceedings, U. S. National Museum. **68**—Science, New York. **86**—Annales, Societe Entomologique de France, Paris. **89**—Zoologische Jahrbucher, Jena. **97**—Zeitschrift fur wissenschaftliche Zoologie, Leipzig. **119**—Archiv fur Naturgeschichte, Berlin. **153**—Bulletin, American Musuem of Natural History, New York. **161**—Proceedings, Biological Society of

Washington. **166**—Internationale Entomologische Zeitschrift, Guben. **179**—Journal of Economic Entomology. **195**—Bulletin, Museum of Comparative Zoology at Harvard College, Cambridge, Mass. **244**—Zeitschrift, Induktive Abstammungs und Vererbungslehre, Berlin. **250**—Delaware College Agricultural Experiment Station, Newark. **257**—Bulletin, Public Museum of the City of Milwaukee. **259**—Publications, Carnegie Institution of Washington. **285**—Nature-Study Review, Urbana, Illinois. **351**—Zeitschrift fur Allgemeine Physiologie. Herausgegeben von Max Verworn, Jena. **365**—Collections Zoologiques du Baron Edm. de Selys Lonchamps, Bruxelles. **368**—The Monthly Bulletin of the State Commission of Horticulture, Sacramento, Cal. **375**—Ergebnisse und Fortschritte der Zoologie herausgegeben von Dr. J. W. Spengel, Jena. **376**—Zoologica. Scientific Contributions of the New York Zoological Society. **377**—Neununddreissigster Jahresbericht des Westfalischen Provinzial-Vereins fur Wissenschaft und Kunst. **378**—Proceedings of the Fruit-Growers Convention of the State of California, Sacramento.

GENERAL SUBJECT. **Burgess, A. F.**—Some shade tree pests in eastern Massachusetts, **179,** v, 172-180. **Demoll & Scheuring**—Die bedeutung der ocellen der insecten, **89,** xxxi, 519-628. **Herrick, G. W.**—Notes on three shade tree pests, **179,** v, 169-172. **Hunter, W. D.**—Results of experiments to determine the effect of roentgen rays upon insects, **179,** v, 188-193. **Knab, F.**—Unconsidered factors in disease transmission by blood-sucking insects, **179,** v, 196-200. **Pierce, Cushman & Hood**—The insect enemies of the cotton boll weevil, **7,** Bul. No. 100, **Schleip, P. W.**—Geschlechtsbestimmende Ursachen im Tierreich, **375,** iii, 165-328. **Schlutter, C.**—Beitrage zur physiologie und morphologie des verdauungsapparates der insekten, **351,** xiii, 155-200. **Smith, J. B.**—Obituary by A. Gibson, **4,** 1912, 97-99. Obituary by H. Osborn, **179,** v, 234-236. **Welch, P. S.**—The insect life of pond and stream, **285,** viii, 139-144 (Cont.) **Zawarzin, A.**—Histologische studien ueber insekten. II. Das sensible nervensystem der Aeschnalarven, **97,** c, 245-286.

APTERA AND NEUROPTERA. **Enderlein, G.**—Embiidinen Monographisch Verarbeit., **365,** Fasc. iii. 121 pp. **Hood, J. D.**—New genera and species of N. Am. Thysanoptera from the south and west, **161,** xxv, 61-76. **Kellogg, V. L.**—Mallophaga from the Hoatzin, **376,** i, 117-121. **Merrill, G. E.**—Pear thrips, **378,** xl, 24-33. **Parrott, P. J.**—The occurrence of the pear thrips in New York, **179,** v, 184-188.

ORTHOPTERA. **Cameron, A. E.,** Structure of the alimentary canal of the stick-insect (Bacillus rosii); with a note on the parthenogenesis of the species, **14,** 1912, 172-182. **Caudell, A. N.**—A new

mantis from British Guiana, **376,** i, 123-124. **Chopard, L.**—Contribution a la faune des Orthopteres de la Guyane Francaise, **86,** lxxx, 315-350. **Gillette, C. P.**—Grasshopper conditions in Colorado, **179,** v, 121-123. **Karny, H.**—Discriptiones Conocephalidarum novarum, **44,** lxi, 334-347. **Meissner, O.**—Ergebnisse einer Dixippus-zucht aus moglicherweise befruchteten eiern, **166,** vi, 13-14. **Milliken, F. B.**—The position assumed by female grasshoppers when ovipositing, **179,** v, 232. **Washburn, F. L.**—Grasshopper work in Minnesota during the season of 1911, **179,** v, 111-121.

HEMIPTERA. Abbott, J. F.—A new type of Corixidae (Ramphocorixa balanodis, n. gen., et sp.) with an account of its life history, **4,** 1912, 113-121 (x). **Essig, E. O.**—The walnut plant louse (Chromaphis juglandicola), **368,** i, 190-194. Plant lice, **378,** xl, 11-19. **Hunter, W. D.**—The cotton stainer (Dysdercus suturellus), **7,** Circ., No. 149. **Watson, J. R.**—Utilization of fungous parasites of Coccidae and Aleurodidae in Florida, **179,** v, 200-204.

LEPIDOPTERA. Borggreve, H.—Geschlechtsdimorphismus einheimischer schmetterlinge, **377,** 1910-11, 47-54. **Chittenden, F. H.**—The larger canna leaf-roller. (Calpodes ethlius), **7,** Circ. No. 145. A little-known cutworm (Porosagrotis vetusta), **7,** Bul. No. 109, 47-51. **Chittenden & Marsh**—The imported cabbage webworm (Hellula undalis), **7,** Bul. No. 109, 23-45. **Clemence, V. L.**—Notes on "Melitaea alma," **4,** 1912, 102. **Dyar, H. G.**—New species of L. from British Guiana, **376,** i, 125-138. **Goldschmidt, R.**—Erblichkeitsstudien an Schmetterlingen I., **244,** Bd. vii, heft, 1, 62 pp. **Houghton, C. O.**—The apple leaf-miner (Tischeria malifoliella), **250,** Bul. No. 87, 1-9. **Hunter, W. D.**—The outbreak of "Alabama argillacea" in 1911, **179,** v, 123-131. **Moulton, J. C.**—On some unintentional evidence in support of the mimicry theories, supplied by a small collection of Bornean butterflies, **8,** 1912, 79-84. **Sheldon, W. G.**—Notes on the life-history of "Colias nastes var werdandi" with description of ova and larva, **9,** 1912, 122-125. **Strand, E.**—Sechs neue exotische grossschmetterlinge, **119,** 1911, Bd. 1, Suppl. 4, 98-102. **Vogel, R.**—Ueber die chordotonalorgane in der wurzel der schmetterlingsflugel, II., **97,** c, 210-244. **Walsingham, L.**—Correction of impossible names, **8,** 1912, 87-89. **Weymer, G.**—Die grossschmetterlinge der erde Fauna americana, pp. 249-256.

DIPTERA. Aldrich, J. M.—(Meigen's 1800 paper), **4,** 1912, 104. **Carnes, E. K.**—Mediterranean fruit fly (Ceratitis capitata), **378,** xl, 71-78. **Houser, J. S.**—The gooseberry gall midge or bud deformer (Rhopalomyia grossulariae), **179,** v, 180-184. **Knab, F.**—The habits of flies of the genus Cordylobia, parasitic on man in Africa, **68,** xxxv, 662-663. **Kraatz, W.**—Chironomidenmetamorphosen, **377,** 1910-11, 71-114. **Muir, F.**—Two n. sp. of Ascodipteron from East

Indies, **195,** liv, 351-366. **Webster, F. M.**—The alfalfa gall midge (Aspondylia miki), **7,** Circ. No. 147.

COLEOPTERA. Bernhauer, M.—Zur Staphylinedenfauna von Sudamerika (9, Beitrag), **38,** xxxi, 68-82. **Coblentz, W. W.**—A physical study of the firefly, **259,** Pub. No. 164, 45 pp. **Fenyes, A.**—Remarks on "Gnypeta thoms," **4,** 1912, 105-112. **Reitter, E.**—Uebersicht der untergattungen und der artengruppen des genus "Otiorrhynchus," **38,** xxxi, 45-67. **Spaeth, F.**—Beschreibung neuer Cassididen nebst synonimischen bemerkungen, **44,** lxi, 241-277. **Webster, F. M.**—The so-called "curlew bug" (Sphenophorus callosus), **7,** Bul. No. **95, 53-71. Wickham, H. F.**—On some fossil Rhynchophorous Coleoptera from Florissant, Colo., **153,** xxxi, 41-55 (x).

HYMENOPTERA. Cockerell, T. D. A.—Names applied to bees of the genus "Osmia" found in No. Am., **50,** xlii, 215-225. **Fernald, H. T.**—Description of certain species of wasps of the family Sphecidae, **50,** xlii, 257-259. **Ferton, C.**—Notes detachees sur l'instinct des H. Melliferes et ravisseurs (7e Serie), **86,** lxxx, 351-412. **Graenicher, S.**—Bees of northwestern Wisconsin, **257,** 1, 221-249 (x). **Houghton, C. O.**—The blackberry leaf miner (Scolioneura capitalis), **250,** Bul. No. 87, 10-15. **Phillips & White**—Historical notes on the causes of bee diseases, **7,** Bul. No. 98. **Schmiedeknecht, O.**—Opuscula Ichneumonologica. Fasc. xxx. Tryphoninae, pp. 2323-2402.

RECENT ENTOMOLOGICAL LITERATURE.

Last year (Annals Ent. Soc. Amer. IV., p. 192) the writer suggested a few simple rules to govern entomological publications; rules which might, it seemed, be made to apply to all taxonomic papers, with the result of avoiding much inconvenience and confusion hereafter. It was thought that in time Entomologists might come to be as exact in presenting their taxonomic results as botanists are today, and this without any great difficulty or effort. The faults intended to be connected by the rules referred to result wholly from poor methods or indifference to matters which experience shows to be important. Thus, in describing a new genus, it is as easy to cite a type species as not; in describing a new species, it is perfectly simple to indicate the type locality. To compare new genera and species with their allies, or state explicitly the characters separating them from others, is a matter of more difficulty; but certainly no one should describe a new genus or species if he has not made the necessary comparisons, and having made them, it should be easy to state them.

In order to call attention to existing deficiencies, and so perhaps stimulate reform, it is proposed to enumerate from time to time recent publications which fail to come up to desired standards. Many or most of these papers are of course extremely valuable contributions

to Entomology, and no criticisms will be directed against their scientific contents; it is obvious, however, that the more valuable the papers, the more to be regretted are any faults in methods of presentation.

Transactions American Entomological Society, Vol. 37, 1911.

A. A. Girault on Trichogrammatidæ. *Trichogrammatoidea* n. g., p. 15. It is a good rule that a generic name should not contain more than six syllables, at most.

C. W. Metz on *Prosopis*: pp. 85-156. *P. conspicua* n. sp., p. 114; no collector given (doubtless collected by Baker). *P. rudbeckiae* n. var. *granulatus,* p. 114; no locality or collector. In other cases the omission of the collector's name is probably due to lack of information.

H. J. Franklin on Bombidæ, pp. 157-168. *Bombus fernaldi*: n. sp. is elaborately described, but the type is deliberately made to be the insect which Fowler referred to *edwardsii,* and defined only by a few words in a table, "first segment yellow" being the only words applicable to this alone! Franklin himself says: "Can those specimens be identified with certainty?" *B. mormonum* n. sp., no collector. *B. mexicensis* n. sp., no data of locality etc. nearer than "Mexico" (perhaps not available). Two new *Psithyrus* described with numerous localities; no type-localities given, and names of collectors omitted, though in many cases known to the author.

N. Banks on Neuropteroids, pp. 335-360. Numerous species described, many without comparison with allies. Collectors' names omitted in some cases when they must have been known to the writer.

Annals of Queensland Museum, No. 10. *Nov.,* 1911.

A. J. Turner on Australian Lepidoptera, pp. 59-135. Very numerous new species, with frequently no reference to allies.

Canadian Entomologist, Vol. XLIII, 1911.

H. Bird on *Papaipema* and *Hydraecia. P. rubiginosa,* p. 40, published as a binomial, but said to be a "new aberration." So also *P. fluxa,* p. 44. Type localities not distinguished. On p. 47 *H. repleta* n. sp. is said to come from "Chinis Mts.," Ariz. This is evidently from one of the Schwarz labels, "Chiric. Mts.," i. e. Chiricahua Mts. This unfortunate abbreviation crops up in many places.

N. Banks on Asilidæ, p. 128. Four n. spp., two without comparison with allies.

C. S. Ludlow on *Culex,* p. 178. *C. borealis* n. sp. from "Alaska;" no exact data, no collectors' names, though these must have been available.

E. D. Ball on Homoptera, p. 107. Entomologists might learn how to spell Schwarz! The new species should be *Thamnotettix schwarzi,* and Ash Fork must be regarded as the type locality.

R. F. Pearsall on Geometrids, p. 205. Two new species, and numerous new records; no collector given.

E. M. Ehrhorn on Coccidæ, p. 275. Several new species; no comparison with allies.

A. D. Macgillivray on *Empria,* p. 305. 21 new species; no comparison with allies. More species on p. 341 et seq.

Barnes & McDunnough on *Cea* on p. 318. Two new species; no collectors given. One has two localities, type locality not stated.

C. R. Crosby on *Derostenus,* p. 414. New species; no comparison with allies.

T. W. Fyles on *Gnorimoschema,* p. 422. New species; no comparison with allies.

T. D. A. Cockerell.

The North American Dragonflies of the Genus Aeshna. By E. M. Walker, B.A., M.B., Lecturer in Zoology in the University of Toronto. University of Toronto Studies, Biological Series, No. 11, University of Toronto Library: Published by the Librarian, 1912. Pp. viii, 213. 28 plates (6 of them in colors). Received April 20, 1912. Price, $2.00.

This monograph, by the Editor of *The Canadian Entomologist,* deals with the species of *Aeshna,* in the narrower sense (excluding those referred to *Coryphaeschna* Williamson), which have been found north of Mexico. It is doubtful whether anyone hitherto has produced a work treating of so many aspects of a group of Odonata as this one does. The systematic portion occupies pages 56-202. Preceding it is a discussion of the taxonomic characters of adult and of nymph; the variations of the adults, climatic, colorational and geographic; and the general life-history.

The discussion of the taxonomic characters devotes much space to descriptions of the color-pattern and external genitalia of the adults and to the relationships of the Aeshninae of the world *inter se.* The author's views on this latter subject are summarized in a phylogenetic tree (p. 24), according to which *Gomphaeschna, Jagoria, Linaeschna, Boyeria, Allopetalia, Basiaeschna, Oplonaeschna* and *Aeshna* are placed as the most generalized of living genera. *Aeshna* is thought "to suggest a polyphyletic origin from several parent genera resembling *Basiaeschna* and *Oplonaeschna,*" while *Anax* is considered to be in most respects "very highly specialized.'

The climatic variations noted are that "with an increase of the mean summer temperature there is an increase in the length and a decrease in the depth of [abdominal] segment 3, and an increase in the length of the female appendages." (p. 29.)

The color variations are exhibited by the females which, as in some other Odonata (*e. g. Ischnura*), are often of two types in the same species, one (homoeochromatic) resembling, the other (heterochromatic) differing from, the colors of the male. "These two color phases are, however, not sharply marked off from one another, but are connected by intermediate forms. "

Geographical variation is best shown in the western half of the continent and it is suggested that this is due to the varied topography of that region.

The section on the general life-history contains many notes on the general ecology of the imagos and nymphs. Some additional details on the copulatory position are furnished and illustrated in plate 2. Detailed accounts of oviposition in two species are given and figured (plate 3). Differences in the eggs of various species are recorded (p. 46); the ovaries of a female *Ae. umbrosa* were found to contain 839 eggs. The wing-buds appear on the exterior of the nymphs when the latter are about 1 cm. long. How many instars precede this appearance was not determined, but "it appears probable that there are three or four ecdyses." Beginning with the stage when the wing-buds are barely indicated, "the nymph apparently moults eight times before emerging as the adult insect . . . . . making a probable total of twelve or thirteen stages." Characters for distinguishing the last eight instars are given. The length of nymphal life in Southern Canada and the Northern United States is probably three years. A description of the transformation of *Ae. canadensis* is illustrated by eight figures (plate 5).

The systematic portion of the work opens with separate keys to the male and female imagos of the 20 species recognized within the geographical limits mentioned. The nymphs of no less than twelve of these species are distinguished in a following key. The specific descriptions are detailed and frequently run to six or more pages. Dr. Walker has been careful to give a minute list of the material determined for each species, the total number of imagos examined having been about 1720.

The plates, reproduced by the Heliotype Co., Boston, from Dr. Walker's own beautiful drawings (some of which we had already seen) illustrate the structural and color characters of both sexes of the adults and also, as far as possible, of the nymphs. On behalf of odonatologists and entomologists generally, we will presume to thank the author's father, Sir Edmund Walker, for the publication of these plates, since he has met their cost, as Prof. R. Ramsay Wright states in the prefatory note.

The number of North American species of *Aeshna* admitted by writers at different times affords a curious study of the psychology of "lumping

and splitting." Hagen, in his Synopsis of 1861, recognized 12 species within the limits of Dr. Walker's monograph, 3 of the 12 being unknown to him and cited, without descriptions, from de Selys' collection. At the same time he admitted two North Asiatic forms (*crenata* and *palmata*) as distinct. Scudder, in 1866, described *propinqua* and *eremita* as additional species. In 1875, Hagen listed 13 species relegating two of the three undescribed species of 1861 to the synonymy, identifying *palmata* Hag. with *constricta* Say, *crenata* Hag. with *eremita* Scud., scattering *propinqua* among three previously described species and adding two *nomina nuda*. The climax in the lumping process was attained by the reviewer whose heinousness is thus dispassionately described by Dr. Walker (p. 127). "This species [*eremita*] was thought by Hagen ('75) to be the same as the Siberian *Ae. crenata* Hag., and Calvert ('94), accepting this view, attempted to show the identity of *Ae. eremita* Scudd. with *Ae. clepsydra* Say. This study was based upon forty male specimens, including at least four species [!!*], but, although a careful piece of work, it takes no cognizance of the important characters found in the accessory genitalia of the males and the thoracic color-pattern."

Martin (Catal. Coll. Zool. Selys, 1908), adopting nearly all the extreme views of Hagen and of Calvert, could list but nine species in question. Then the tide turned with the appearance of Dr. Walker's paper in the *Canadian Entomologist* for November and December, 1908, separating again several of the forms which Hagen and his followers had united, such as *palmata* and *crenata*, adding several new ones and recognizing a total of nineteen. That paper was an outline, taxonomically, of the work now under review where (p. 8), Dr. Walker has accounted for the existence of the "lumping" thus: "The color-pattern in the genus *Aeshna* is on the whole very uniform, remarkably so in the North American species, and in the ordinary cabinet specimens the appearance of uniformity is exaggerated by the disappearance of the natural colors and the frequent obscurity of the markings. Hence Odonatists generally have relied almost exclusively upon structural features in characterizing the species of this genus, particularly upon the abdominal appendages of the male, with the result that the species of *Aeshna* have been 'lumped' to an unusual degree and the belief has become prevalent that the coloration, though relatively uniform for the genus, is very variable within the limits of a given species."

From the zoogeographical standpoint, we may call attention to Dr. Walker's remark (p. 56): "Although the number of described North American species of *Aeshna* is somewhat greater than that of the Palae-

*These indicate *our own* sense of horror.

arctic species, the latter are more diversified in size, structure and color-pattern and represent a larger number of groups."

The list of literature cited occupies the last ten pages. The only serious lack in the volume is that of an index, although its absence is somewhat compensated for by a two-page table of contents.

All in all, the work is of the highest value and we heartily congratulate Dr. Walker on his achievement.—P. P. C.

Doings of Societies.

FELDMAN COLLECTING SOCIAL.

Meeting of January 17, 1912, at 1523 South Thirteenth Street, Philadelphia, Pa. Eleven members were present. Mr. L. H. Traunweiser, of this city, visitor. President Haimbach in the chair.

The President read his annual address which was ordered to be incorporated in the minutes.

The following officers were nominated and elected to serve for the year 1912: President, Frank Haimbach; Vice-President, H. A. Wenzel; Treasurer, H. W. Wenzel, Secretary, Geo. M. Greene; Ass't-Secretary, Chas. T. Greene.

Mr. Harbeck said he had received a letter from Mr. Manee which contained a very well-executed sketch of a fly, thinking it was a new genus and species, and suggested names for it, but it was a Stratiomyid, *Hermetia illucens* Linn.

Mr. Wenzel, Sr., stated that he had put into his collection all the species collected in Southwestern Texas by Mr. Wenzel, Jr., except those unknown to him which he had put aside. These were exhibited. The genus *Zygops* was only represented by one species, *seminiveus* LeC., until Casey described a new one, *suffusus*, of which Mr. Wenzel, Jr., succeeded in getting a single specimen in the Chisos Mts., VII, 21. This was exhibited with a specimen of the former species, also collected by Mr. Wenzel, Jr., in the Huachuca Mts., Arizona, VII, 10.

Dr. Skinner said that for some time he had been thinking over a subject that had bothered him considerably and at present he saw no solution of the problem. Namely, what are we going to do about getting specimens named? Some time

ago a brief article appeared in ENTOMOLOGICAL NEWS in regard to this subject, and individuals and institutions were criticised for being derelict in this respect. A letter was received from Dr. Howard in relation thereto, in which he contended that the number of collectors had greatly increased and that the old conditions had materially changed.

Dr. Skinner said he believed that the specialists and systematists had increased proportionately. He cited the older men as doing an immense amount of identification work and they were nearly all engaged in pursuits other than entomology for a livelihood. He cited Osten Sacken's Memoirs, where the author mentioned naming material from all over the country and at that time the Baron was a busy diplomat, traveled much and had many social obligations. Drs. LeConte and Horn were mentioned as doing a large amount of work in this particular for men and institutions all over the United States. Mr. E. T. Cresson, W. H. Edwards, Dr. John B. Smith and Dr. James Fletcher were also examples. Dr. Fletcher acted as the good father of all Canadian entomologists, named their material and encouraged them in every way, often working into the small hours of the night for this purpose, after his day's work was done. He thought the entomologists should take up this matter and have it rectified in some way.

This led to a general discussion on the subject and Mr. Wenzel, Sr., read a letter from Thomas B. Ashton, dated Feb. 8, 1895, relative to Dr. Horn and this subject.

Mr. Laurent exhibited a specimen of *Calosoma sycophanta* Linn. (Col.) from Berlin, Germany, V-10, collected by P. Albrecht, and referred to a late paper on the subject from the Bureau of Entomology.

Mr. Kaeber exhibited a specimen of *Monohammus titillator* Fabr. (Col.) picked up on the city streets, IX-30-11. Mr. Wenzel, Sr., said it had most probably bred from pine kindling wood.

Adjourned to the refectory.

GEO. M. GREENE, *Secretary.*

OBITURY.

Dr. Nettie M. Stevens.

In the death of Dr. N. M. Stevens, which occurred on May 4, 1912, in the Johns Hopkins Hospital, Baltimore, American zoology loses a distinguished, patient and industrious investigator. Her researches for the most part lay outside the field of entomology, but, like the late Professor Montgomery's as pointed out in our May number, her cytological material was often drawn from insects. Like Professor Montgomery also, she was among the first in the study of the chromosomes of the germ cells and their relation to differences in sex. In at least ten papers, between 1905 and 1911, she dealt with these structures in Termites, Orthoptera, Coleoptera, Aphids and Diptera.

Miss Stevens was born at Cavendish, Vermont, July 7, 1861, received her early education at Westford and Westfield, Massachusetts, and subsequently taught school in that part of the State. Removing to California, she entered Leland Stanford Junior University, where she obtained the bachelor's and master's degrees in 1899 and 1900. Graduate work in zoological subjects at Stanford, Bryn Mawr, Wood's Hole and Wurzburg followed, and in 1903 she received the Ph. D. from Bryn Mawr, where she has since served first as Reader (1904-05) and then as Associate in Experimental Morphology (1905 on).

Undaunted by the presence of one of the most dreaded of human diseases, she directed the work of her students from the Hospital until within a few days of the end; unyielding as long as consciousness remained, she confidently looked forward to renewing her researches. P. P. C.

Shigeru Kuwayama.

In reply to a request for a copy of "Die Psylliden Japans I and II" by Shigeru Kuwayama, I have received word from his father (who sent the papers) at Sapporo that "my eldest son Shigeru Kuwayama, who was a Bachelor of Agriculture here, passed away calmly this year on February 17th."

May 8, 1912. Edith M. Patch.

EXCHANGES.

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☞ These notices are continued as long as our limited space will allow; the new ones are added at the end of the column, and only when necessary those at the top (being longest in) are discontinued

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Tom Spalding will collect 1912 Utah Lepidoptera, Coleoptera, etc., particularly Papilionidae, Catocalae, Cicindelidae.—Provo, Utah.

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